

CHAPTER 8

SAMPLING AND ANALYSIS PLAN REQUIREMENTS

8-1. General. Read this chapter for preparation guidelines for the Sampling and Analysis Plan (SAP). The SAP includes a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP). The FSP describes field activities, and the QAPP describes the laboratory-related activities of analysis, laboratory quality control and reporting. See EM 200-1-2 and EM 200-1-3 for additional guidance.

Plan requirements apply to all projects whether at active installations, through the Installation Restoration Program (IRP), Formerly Used Defense Sites (FUDS), or at Civil Works facilities. The plan's objective is to assure quality data in order to classify an UST as one that has not produced chemical contamination allowing removal by the local district or, as an UST that has caused soil or groundwater chemical contamination requiring further evaluation³ or remediation.

8-2. Plan Contents. The SAP must include the following items:

- a. Title Page. The title page must contain the project name, project location, contract number, phase, date, and contractor's name and address, if applicable.
- b. Table of Contents.
- c. Project Description. The scope of work and relevant background material, as applied to the collection of chemical data, must be briefly described. Any description of toxic or hazardous substances that may be encountered at the site should be included, if known. In addition, a brief description of the site conditions, such as geology and surface water, should be included.
- d. Chemical Data Quality Objectives. Briefly describe the level and extent of chemical data required to support decisions during the project. EM 200-1-2 has guidance concerning preparation of Data Quality Objectives. The data must provide a basis for decision making related to the tank, its contents, and any releases to the environment. The data must allow decisions to be made regarding future site remediation, determination of whether contamination is a result of Department of Defense (DOD) activities, and determination of disposal methods for all wastes generated onsite. Finally, the results must be determined in a manner that complies with all applicable federal, state, and local regulations governing USTs.
- e. Project Organization and Functional Area Responsibility. The following functions must be fulfilled. In smaller projects, one person may have multiple responsibilities.

- (1) Contracting Officer's Representative (COR) represents the USACE and serves as liaison between the USACE and the contractor.
- (2) Contractor's Project Manager reviews and approves field operations procedures, assures that these procedures meet quality control (QC) objectives, and provides technical insight.
- (3) Contractor's Field Sampling Supervisor is responsible for the management of the field sampling team during onsite activities.
- (4) Field Technician/Project Chemist is responsible for collecting, packaging, and shipping samples.
- (5) QC Program Manager is responsible for maintaining all aspects of QC during field operations.
- (6) Site Safety and Health Officer (SSHO) is responsible for the safety of all site personnel and for ensuring that all field operations are in compliance with the Site Safety and Health Plan (See Chapter 7).

f. Field Activities. Include discussion of the proposed field activities in the SAP document, along with the following information, as applicable:

- List of field equipment, containers, and supplies.
- Sampling locations.
- Sampling procedures.
- Field screening.
- Quality control samples.
- Quality assurance samples.
- Sample documentation.
- Spill reporting requirements.

g. Chain-of-Custody and Transportation. Include discussion of the documentation and shipping requirements. See paragraph 8-3 below for details.

h. Laboratory Activities. Discuss the laboratory procedures and methods followed in the SAP. See Paragraph 8-4 for details.

8-3. Sample Packaging, Shipping, and Chain-of-Custody. The USACE furnishes detailed guidance regarding sample handling in *Sample Documentation and Shipment Instructions* (Appendix F of EM 200-1-3). It must be provided by the COR. Follow this protocol explicitly with the exception of those details in which the protocol disagrees with more stringent state or local regulations. The fundamental details of sample handling as they pertain to UST actions are summarized in this section.

- a. Low-, Medium-, and High-Concentration Samples. All nonaqueous samples taken from the tank contents must be considered as high-concentration samples and handled accordingly. All aqueous samples exhibiting evidence of contamination (appearance, odor, OVA results) must be treated as medium-concentration samples. All other nonaqueous and aqueous samples should be considered as low-concentration samples unless there is reason to believe otherwise.
- b. Receipt for Samples. The current site owner, operator, or agent-in-charge is legally entitled to the following:
 - (1) A receipt describing the samples obtained from the site.
 - (2) A portion of each sample equal in weight or volume to the portion retained, (i.e. split sample) if requested. If the samples are refused, refusal should be noted on the receipt for samples. The samples should then be disposed as investigation-derived waste.
- c. Sample Labeling. Each sample bottle must be labeled. Write the sample number on the can lid. The label must not soak off or become illegible if exposed to water for the time it takes to ship the samples to the laboratory. Use indelible ink to mark the labels. Include the following on each label:
 - Date.
 - Time of collection.
 - Site name.
 - A brief description of the sample.
 - Type of sample (grab, composite).
 - Preservatives used.
 - Analyses required.
 - Sample number as assigned in the field.
 - Sampler's signature.

See Figure 8.1 for appropriate label or tag formats. Create local forms that meet your specific needs.

Special consideration must be given to DOT labeling requirements for any sample suspected to exhibit a DOT hazard class. For example, nitric acid containing mixtures exhibiting a DOT corrosive characteristic at the packing group I or II level are required to be labeled with a "cargo aircraft only" label as well as a "corrosive" label.

- d. Sample Packaging. Proper sample packaging assures that samples will arrive at the laboratories in acceptable condition and that sample

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Designate <hr/> Comp. Grab		Preservative: Yes No	
		ANALYSIS	
Time		BOD Anions Solids (TSS) (TDS) (SS)	
Month Day Year Sampler (Signature)		COD TOC Nutrients Phenolics Mercury	
		Metals Cyanide Oil & Grease	
Project Code Station Code Location Station		Organics GCC/MS	
		Priority Pollutants	
		Volatile Organics	
		Pesticides	
		Mutagenicity	
		Bacteriology	
		Remarks:	
Tag No.		Lab Sample No.	

FIGURE 8-1. EXAMPLE OF SAMPLE TAG OR LABEL

validity and integrity have not been compromised. This section provides guidelines for sample packaging activities. Give special

consideration to DOT packaging requirements for samples exhibiting or suspected to exhibit a DOT hazard class.

- (1) Tape all sample bottles shut with strapping tape. The only exception to this rule applies to samples for volatile organic analysis. The string from the numbered tag, if used, should be secured around the lid. Mark the level of all liquid samples on the bottle with a grease pencil to provide a reference level that could be used to identify a leaking container.
- (2) Place each bottle in a clear plastic bag (Ziploc® or equivalent) through which the sample tag and label are visible and seal the bags.
- (3) Ship samples of medium- and high-concentration wastes in metal cans inside the cooler. More than one bottle may be placed in each can as long as they do not touch one another.

For packages containing materials suspected to meet a DOT hazard class, the package (bottle, can, and cooler) must meet DOT performance-oriented packaging requirements for combination packaging (or must meet conditions for an applicable limited quantity exception). Also, to comply with DOT regulations (unless specifically excepted by regulation) mark outer packages with "This Side Up" (along with an orientation arrow); the DOT proper shipping name and hazard class for the material such as "Flammable Liquid N.O.S. UN 1993" or "Corrosive Liquid N.O.S. UN 1760;" and the shipper's or consignee's name and address.

Place an appropriate hazard class label and a "cargo aircraft only" label, if applicable, on the package.

Refer to EM 200-1-3, *Appendix F, Sample Documentation and Shipment Instructions* for further details regarding the shipping of high-concentration samples.

- (4) Place the samples in steel or reinforced plastic coolers for shipment to the laboratories. Line coolers with about 75 mm (3 inches) of cushioning material (only 25 mm (1 inch) under cans) such as Styrofoam peanuts. Place the sample bottles, contained in plastic bags, in such a fashion that they will not touch during shipment. Cover sample bottles with additional packing material to at least halfway up. Place sealed bags of ice (or ice substitute) near, *but not touching*, the samples. Ice should also be placed above the samples.

- (5) Before closing the cooler, place a chain-of-custody record (see Figure 8-2 for example format) in a waterproof plastic bag and tape it to the inside of the cooler lid. Create local forms that meet your specific needs. Appropriate additional documentation may be sent along with the chain-of-custody forms to the laboratory. Chain-of-custody procedures are discussed in detail later in the chapter.
- (6) Shut the cooler and secure it by wrapping strapping tape completely around the cooler at a minimum of two locations. Tape the drain shut.

e. Sample Shipping.

- (1) Attach shipping labels to the top of the cooler.
- (2) Number and sign custody seals and affix on the front right and back left of cooler. Cover custody seals with wide, clear tape.
- (3) Affix labels "This Side Up" (with appropriate arrow) on all four sides and "Fragile" labels on at least two sides.
- (4) Place the proper shipping name and identification number (i.e., "Flammable Liquid N.O.S., UN 1993") on all sides of the cooler, as appropriate.
- (5) Inform the shipper of the nature of the contents to determine applicable DOT requirements. Complete hazardous material shipping documents, also known as bill of ladings, for all shipments of medium and high concentration samples.
- (6) If the samples are shipped using a limited quantity exception indicate on the bill of lading (i.e., "Ltd Qty" or "limited quantity").
- (7) The shipper must ensure that the samples will arrive at the laboratory by the next day.
- (8) Include additional information with sample shipments utilizing the RCRA sample exclusion, in 40 CFR 261.4(d) or equivalent state regulation. This would apply, for example, to ignitable waste samples. The following must accompany the sample: (1) the sample collector's name, address, and telephone number; (2) the lab's name, address and telephone number; (3) the quantity of the sample; (4) the date of shipment; and (5) a description of the sample.

- (9) Consider maximum weight restrictions applicable to some shippers when filling coolers.
 - (10) It is acceptable for personnel from the contractor's sampling team or from the analytical laboratory to transport samples from the field to the analytical laboratory as long as the delivery time is comparable to that available from commercial carriers. If this option is exercised, the SAP must explain in sufficient detail how and when sample custody will be transferred.
 - (11) QA samples must be shipped by a commercial carrier that provides overnight delivery from the field to the QA laboratory or delivered personally.
 - (12) The field sampling supervisor must notify (by telephone) the sample custodians at the contractor's analytical laboratory and the QA laboratory of the intended sample arrival time. Make this notification least 2 working days in advance of delivery. Avoid weekend deliveries unless prearranged.
 - (13) For more information on regulations regarding shipping of hazardous materials, refer to *Title 49, Subchapter C, of the Code of Federal Regulations*.
- f. Chain-of-Custody. A custody form is used to track samples from the field to the laboratory and through the course of the analytical work.
- (1) Chain-of-custody is initiated in the field when samples are first placed in coolers for shipping. The custody forms are filled out by the contractor's sampling team. Custody is maintained during shipping with the custody seal. The chain-of-custody is continued in the laboratory from the time of sample receipt to the time the sample is discarded.
 - (2) List only one site per custody form. If the contractor is sampling at two or more different UST sites, each site must be tracked with an independent custody form. Ship the original with the samples and keep a copy for the sampling contractor's files.
 - (3) In the laboratory, a record of sample custody is maintained as follows:

Chain of Custody (COC) Record

Chain of Custody No.		Project No./Title		Analyses						Project Point of Contact		Phone Number	
										Scope of Work Document(s):			
Date	Time	Sample Identification	# of Bottles							Matrix	Comments		
Samples Preserved?				Yes ⁽¹⁾						No			
Date	Time	Relinquished by		Date						Time	Received by		
Date	Time	Relinquished by		Date						Time	Received by		
Date	Time	Relinquished by		Date						Time	Received by		

FIGURE 8.2. Example Chain-of-Custody Record

- (a) All incoming samples are received by a sample custodian who shall indicate receipt by signing the accompanying custody forms. The sample custodian files these forms with the project file as a permanent record.
 - (b) The laboratory manager is notified of receipt of samples and notifies the various analytical groups of the required analytical work. Individuals from each analytical group maintain the chain-of-custody while checking out samples, performing the extractions and analyses, and returning the samples to the sample custodian.
- (4) See Figure 8-2 for an example format of a chain-of-custody record. Create local forms that meet your specific needs; be sure to include the name and location of the company or laboratory.

8-4. Sample Analysis and Data Reporting. Describe planned sample analysis activities in the SAP. Include required analyses, methods, the analytical laboratory selected, and the vague particulars of data reporting.

This section provides general requirements regarding approved methods, data reporting, and laboratory validation. The contractor is bound to follow all site-specific requirements as set forth in the Scope of Work (SOW) and should use this section only as a guide to fill in details not explicitly stated in the SOW.

- a. Methods for Sample Analysis. Perform all sample analyses of water or soils using standard EPA methods as listed in Tables 8-1 and 8-2. All procedures specified must be followed exactly with no deviations unless modifications are specifically authorized by the designated project QA laboratory. All method QC requirements will be followed explicitly. The running of QC duplicates, spike samples, and method blanks must be in accordance with the laboratory QA/QC plan as set forth in the Laboratory Quality Management Manual (LQMM), or at least the rate specified in the method. At a minimum, this rate will be 1 in 20, but at least 1 per batch. The laboratory is required to report internal QC data (instrument blanks, method blanks, spike matrix recoveries, and internal duplicates, etc.) for a minimum of 5 percent of the project samples.

The USACE **encourages** the use of their samples for internal QC checks (matrix spike recovery or internal duplicate). If a USACE sample is selected for an internal QC check for a batch that

**TABLE 8-1 METHODS FOR DETERMINATION OF METALS
(RCRA and Priority Pollutants) by Atomic Absorption and Inductively Coupled
Plasma**

Metal	Technique ¹	Digestion and Analysis Method ⁴		
		Soil/Sediment	Groundwater ²	Surface Water ²
Arsenic (As)	GF	3050/7060	Inc ³ /7060	206.2
	H	Inc ³ /7061	Inc ³ /7061	206.3
Barium (Ba)	DA	3050/7080	3005/7080	208.2
	GF	-	-	208.2
	ICP	3050/6010	3005/6010	200.7
Cadmium (Cd)	DA	3050/7130	3005/7130	213.1
	GF	3050/7131	3020/7131	213.2
	ICP	3050/6010	3005/6010	200.7
Chromium (Cr)	DA	3050/7190	3005/7190	218.1
	GF	3050/7191	3020/7191	218.2
	ICP	3050/6010	3005/6010	200.7
Iron (Fe)	DA	3050/7380	3005/7380	236.1
	GF	-	-	236.2
	ICP	3050/6010	3005/6010	200.7
Lead (Pb)	DA	3050/7420	3005/7420	239.1
	GF	3050/7421	3020/7421	239.2
	ICP	3050/6010	3005/6010	200.7
Manganese (Mn)	DA	3050/7460	3050/7460	243.1
	GF	-	-	243.2
	ICP	3050/6010	3050/6010	200.7
Mercury (Hg)	CV	Inc ³ /7471	Inc ³ /7470	245.1
Selenium (Se)	GF	3050/7740	Inc ³ /7740	270.2
	H	Inc ³ /7741	Inc ³ /7741	270.3
Silver (Ag)	DA	Inc ³ /7760	Inc ³ /7760	272.1
	GF	-	-	272.2
	ICP	3050/6010	3005/6010	200.7
Sodium (Na)	DA	3050/7770	3005/7770	273.1
	GF	-	-	273.2
	ICP	3050/6010	3005/6010	200.7

NOTES:

¹Abbreviations: CV = Cold Vapor; DA = Direct Aspiration; GF = Graphite Furnace; H = Hydride; ICP = Inductively Coupled Plasma

²(a) Any water sample may be analyzed by SW-846 methods. Groundwater samples must be analyzed by the SW-846 methods. Surface water and other water samples (drinking, silo, leachate, etc.) may be analyzed by the 200-series or the SW-846 series methods.

(b) Other extraction procedures may be appropriate instead of those listed. Methods 3010 (for flame and ICP) and 3020 (for graphite furnace) are used as extraction procedures for Total Metals and are used in EP TOX or TCLP extractions. Method 3040 is used to extract metals from oily wastes (greases, waxes, etc.).

(c) All 200 series methods are from EPA 600/4-79-020 (1983) Methods for Chemical Analysis of Water and Wastes; all other methods are from SW-846 (1986), Test Methods for Evaluation of Solid Waste (including all promulgated updates).

³Method-specific extraction procedure is incorporated into method. For arsenic this involves digestion by 3050 followed by additional digestion in the method. For silver, digestion by 3050 is used with modification: approximately twice as much HCl is used. ⁴Latest promulgated versions of referenced methods should be used.

TABLE 8-2 METHODS FOR DETERMINATION OF NONMETALLIC ANALYTES				
Part 1. Organic Analytes ⁸				
Organic Analytes	Technique ¹	Extraction and Analysis Methods		
		Soil/Sediment	Groundwater ²	Surface Water ²
Halogenated Volatile Organics	GC	5030/8021	5030/8021 ³	6013
Aromatic Volatile Organics (or BTEX)	GC	5030/8021	5030/8021 ³	6023
PCBs	GC	3540/8082 3550/8082	3510/8082 3520/8082	608
Volatile Organics	GC/MS	Inc ⁴ /8260	Inc ⁴ /8260	624
Part 2. Miscellaneous Analytes ⁸				
Misc. Analytes	Technique ¹	Preparation and Analysis Methods		
		Soil/Sediment	Groundwater ²	Surface Water ²
TRPH ⁵	IR	9071/418.1 ⁵	418.1	418.1
Fuel Constituents	GC	Modified EPA Method 8015		
Ignitability		1010 or 1020		
Corrosivity		9045	9040/1110	9040/1110
Reactivity		(Sections 7.3.3 and 7.3.4 of SW-846)		
EP Toxicity-Metals		13106	13106	
TCLP-Metals		Federal Register ^{6,7}		
pH		9045	9040	

NOTES:

¹Abbreviations: DA = Direct Aspiration; GC = Gas Chromatograph; GC/MS = Gas Chromatograph/Mass Spectroscopy; IR = Infrared Spectroscopy.

²(a) Any water sample may be analyzed by SW-846 methods. Groundwater samples must be analyzed by the SW-846 methods. Surface water and other water samples (drinking, silo, leachate, etc.) may be analyzed by the 200-series or the SW-846 series methods.

(b) All 300-600 series methods are from EPA 600/4-79-020 (1983) *Methods for Chemical Analysis of Water and Wastes*; all other methods are from SW-846 (1986), *Test Methods for Evaluation of Solid Waste (including all promulgated updates)*.

³Direct injection may be used for high concentrations of contaminants in water. It is preferable to use Method 8260. If Method 8015, 8021, 601, or 602 is used, it is necessary to confirm results with a dual-column injection or a validation by GC/MS.

⁴Method-specific extraction procedure is incorporated into method.

⁵Some states require specific methods other than those cited here for the determination of petroleum hydrocarbons. In these cases, the state-required methods should be used. If the cited method for Total Recoverable Petroleum Hydrocarbons is used, follow extraction through Step 7.11 and then dilute with Freon-113 to 100 mL.

⁶Extraction procedure only. Analysis (Table 8-1) must follow.

⁷Federal Register March 29, 1990 (SW-846, 3rd Ed. 1311). TCLP leachates are analyzed by one or more of the following methods: 6010, 7060, 7470 and 7740. Scope must specify which analyses are to be performed on TCLP leachate extracts.

- Internal Quality Control: The number and types of internal QC checks shall be defined clearly in the SAP. The USACE requirements are basically the same as those given in the EPA method. The only significant difference is that the USACE encourages (Section 5.1) that its samples be treated as an independent set so that all applicable QC checks are applied to the set of USACE samples even though the USACE sample size may be small. A list of all applicable checks must be enumerated in the SOW and SAP in order to assure the USACE that the analytical laboratory is aware of these requirements for internal QC checks. These include:
 - Limits of data acceptability and corrective action to be taken when these limits are exceeded must be described.
 - Corrective Action: The feedback system in place to deal with problems identified by these internal QC checks must be described. Personnel responsible for executing this corrective action must be identified.
 - The methods for determining precision, accuracy, and instrument sensitivity (detection and quantitation limits) must be described.
 - Procedures for calibration and the frequency of calibration checks for laboratory instrumentation shall be described.

⁸Latest promulgated versions of referenced methods should be used.

contains samples from another client, the USACE requests a copy of the results obtained.

The detection limits stated in the SOW (or by the nominal values given for each method) must be met by the contractor's laboratory. All samples must be extracted (or digested) and analyzed within the specific holding times specified by each method. All analyses must be performed by the designated laboratory (or laboratories) and may not be subcontracted.

b. QA and QC Frequency. Normally for most smaller USTs, the number of QA/QC field check samples is limited to the following:

(1) For the tank water samples: Collect one sample in triplicate. One sample set may be collected for rinsate verification and sent to the contractor's laboratory and QA laboratory. Provide one pair of trip blanks for each cooler that contains aqueous samples for VOA.

(2) For the high-concentration organic samples and sludge samples: Collect one sample in triplicate.

c. Data Reporting. The USACE requirements for reporting the analytical data were established to effectively report analytical results along with the appropriate QC information needed to assess reliability. These requirements are based on simplified contract laboratory program (CLP) or EPA SW-846 or other performance-based methods deliverables package. See EM 200-1-3 and EM 200-1-6 for general information.

(1) General Requirements. The contractor and the analytical laboratory must concur on how certain data reporting requirements are to be handled. Details describing each of the following data reporting requirements must be given in the SAP and approved prior to the start of work.

(a) Data computations. All units of expression and equations required to calculate concentrations or the values of measured parameters must be provided.

(b) Unusual results. Plans for treating outliers or other results that appear unusual or questionable.

(c) Loss of control. Plans for treating data and reanalysis of samples that have been handled during periods of loss of analytical control.

(d) Data handling. Description of the data management systems: collection of raw data, data storage and conversion, data and calculations review, and data quality assurance documentation.

- (e) Personnel. Identify all personnel that will be involved in the data reporting sequence for this specific project.
 - (f) Precision, Accuracy, and Completeness. Procedures to assess these parameters of the analytical data must be described. The laboratory must maintain appropriate control charts.
- (2) Sample Description. The laboratory is asked to supply a brief physical description of the sample. The following guidelines should be used.
- (a) Water Samples. Coloration and clarity.
 - (b) Soil/Sediment/Sludge Samples. Coloration, texture, and artifacts.
 - (c) Recommended Descriptive Terms.
 - Coloration: red, orange, yellow, green, blue, violet, black, grey, brown, white, colorless, etc; dark or light.
 - Clarity: clear, cloudy, opaque.
 - Texture: fine (powdery), medium (sand), coarse (large crystals or rocks).
- (3) Data Qualifications. These symbols are used to qualify the analytical results, as necessary. They should be used in place of or adjacent to the appropriate analytical result.
- U = Analyte not detected at the laboratory reporting limit
 - J = Analyte detected below the laboratory reporting limit, concentration is estimated
 - B = Analyte detected in the method blank
 - NA = Not analyzed
 - NR = Not reported
 - BDL = Analyte not detected at the laboratory reporting limit
- (4) Internal Quality Control Reporting. The laboratory should report the results for the following quality control samples:
- (a) Laboratory Method Blanks
 - (b) Surrogate Spike Recovery
 - (c) Matrix Spike Samples
 - (d) Lab Duplicates
 - (e) Lab Control (Blank Spike) Samples.

- d. Holding Times. Table 8-3 summarizes the maximum holding times, preservation requirements, and bottles (containers) for various analytes. All of the bottles must be obtained precleaned from an EPA-approved supplier. These values are established by the EPA. Exceeding the maximum holding time would jeopardize the validity of the analytical results. During construction, the SOW may require very short turnaround times for analysis because of the nature of the project phase. The analytical laboratory selected as a contractor must agree to abide by these analysis turnaround times.
- e. Detection and Quantitation Limits. The SOW may specify required detection or quantitation limits based on state and local requirements and on a Record of Decision. If these limits are not specified, it is to be assumed that the nominal values provided by SW-846 or the CLP User's Guide apply.

8-5. Commercial Analytical Laboratory. USACE validation of the project laboratory is optional for UST work. The project manager may request validation by the HTRW-CX or accept state validations at his or her discretion. If the project involves HTRW factors the project manager should request validation by the HTRW-CX. The laboratory validation process takes several weeks with the time required depending primarily on how promptly the laboratory responds. The USACE laboratory validation process for UST projects is described in a memo from CEMP-RT dated 14 September 1993, titled "Hazardous, Toxic & Radioactive Waste (HTRW) - Policy Guidance on Validation of Commercial Analytical Chemistry Laboratories".

8-6. Government Analytical Laboratories. Chemical analyses may be performed by USACE laboratories when sampling is performed by government personnel.

8-7. Quality Assurance Laboratory. The USACE Design District responsible for the UST action will propose the use of a USACE or other referee laboratory as the project's quality assurance laboratory if QA samples are to be collected.

8-8. Sample Numbering System. UST samples collected under contract with the USACE must be numbered using a USACE numbering system as described below:

aaaa-bbbb-cccc

aaaa = Four-character designation of the project name

bbbb = Four-character designation of the sampling subsite

cccc = Four-number character sequential numerical designation starting with '0001' for the first sample and incrementing by one for each subsequent sample.

TABLE 8-3
SUMMARY OF SAMPLE CONTAINER, PRESERVATION, AND MAXIMUM HOLDING TIMES

Matrix	Parameter ¹	Container ²	Preservation ³	Maximum Holding Times	
				Extraction ⁴	Analysis
Water	Volatiles	2 X 40 mL G, Septa vials	Ice to 4 °C HCl to pH<2	-	14 d
Water	PCBs	2 X 1 L ⁵ amber G	Ice to 4 °C	7 d	40 d
Water	Metals ⁶	1 X 1 L P	HNO ₃ to pH<2	-	6 mo ⁶
Water	TRPH	2 X 1 L G	Ice to 4 °C HCl to pH<2	-	28 d
Soils	Volatiles	2 X 4 oz (or 2 X 120 mL) G, Septa lids	Ice to 4 °C	-	14 d
Soils/Sediments	PCBs	1 X 8 oz G (or 1 X 240 mL)	Ice to 4 °C	7 d	40 d
Soils/Sediments	Metals/ TRPH	1 X 8 oz G (or 1 X 240 mL)	Ice to 4 °C (TRPH only)	-	6 mo ⁶ (TRPH: 28 d)
High Concentration Wastes	Volatiles	2 X 40 mL G, Septa vials	Ice to 4 °C	-	14 d
High Concentration Wastes	PCBs	1 X 40 mL G, Septa vial	Ice to 4 °C	-	
Product	All	1 X 250 mL G ⁷		-	

NOTES:

¹Abbreviation: TRPH = Total Recoverable Petroleum Hydrocarbon.

²All containers must have Teflon-lined seals (Teflon-lined septa for VOA vials). G = Glass; P = High-density polyethylene. Samples for analysis for volatiles must have septa lids.

³Sample preservation will be done in the field immediately upon sample collection.

⁴When only one holding time is given, it implies total holding time from sampling until analysis.

⁵Triplicate sample sets are required on at least 5 to 10 percent (but at least one) sample so that the laboratory can perform all method QC checks for SW-846 methods.

⁶Total Recoverable Metals for water samples. Holding time for Hg is 28 days in glass.

⁷Collect only one 250 mL sample.

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The following abbreviations should be used to designate the nature of each sample:

- TK - Tank
- SS - Surface Soil Boring
- SW - Surface Water
- SL - Sludge
- SB - Subsurface Soil
- MW - Monitoring Well
- SD - Sediment

8-9. Sample Documentation. Each sampling team or individual performing a particular sampling activity is required to record pertinent information in a bound field logbook with prenumbered pages. All entries shall be made with indelible ink. Mistakes must be crossed out with a single line, corrected, initialed, and dated.